Table G.50. Degradation Rates of Selected Organic Chemicals Hypothetically Associated with Waste Disposed of Before 1988

Chemical	Biotic ($t_{1/2}$) Days (Soil)	Abiotic ($_{1/2}$) Days
1,1,1-trichloroethane	140 to 273[(a)] No observed degradation in 189 days[(b)]	180 (hydrolysis)[(b)]
Dichloromethane (methylene chloride)	7 to 28[(a)]	Not important because of volatility[(b)]
Xylene	7 to 28[(a)] 70% degradation at 10 days (aerobic), > 180 days (anaerobic)	Resistant to hydrolysis[(b)]
Toluene	4 to 22[(a)] < 2 to < 10 (aerobic)[(c)]	No significant hydrolysis under normal environmental conditions[(b)]
PCBs	>50 (Arochlor 1016)[(c)] >50 (Arochlor 1254)[(c)]	Arochlor 1016 and 1254 hydrolysis (not environmentally significant)[(c)]
Total petroleum hydrocarbons (TPH)[(d)]	5 to 16 (benzene)[(a)] benzo[(a)] pyrene (57 to 530)[(a)]	Not a significant process (benzene)[(b)] No hydrolyzable groups (benzo(a)pyrene[(a)]

(a) Howard et al. (1991).
(b) Howard (1990).
(c) Mackay et al. (1992).
(d) TPH is a bulk measurement made on the quantity of petroleum present in an environmental sample. Petroleum consists of thousands of individual aliphatic and aromatic compounds. Therefore, assessing its degradation rate in soil is not possible. The values listed in the table is an effort to bound the degradation rate of petroleum using two known constituents of petroleum (that is, benzene and benzo [a] pyrene) that are at opposite ends of the spectrum with respect to physical-chemical properties.

Table G.51. Degradation Rates Due to Volatilization of Selected Organic Chemicals Hypothetically Associated with Waste Disposed of Before 1988 Using Methods by Strenge and Peterson (1989)[(a)]

Chemical	Degradation Due to Volatization Expressed as a Half-Life ($t_{1/2}$), in Days (Soil)
1,1,1-trichloroethane	233
Methylene chloride	842
Xylene	220
Toluene	267
PCBs	43800
Diesel fuel	24600
Hydraulic fluid	8700

(a) The escape of volatile chemicals from farmland soil following deposition from irrigation water is accounted for using a volatilization half time. The MEPAS volatilization source model has been used to estimate the initial rate of release of volatile chemicals from a uniformly contaminated layer of soil 15 cm thick (plow depth). The initial release rate (expressed as g/day) divided by the total amount in the soil (g) provides an effective removal rate constant (per day). This rate constant is then converted to an effective volatilization removal half time, which is entered into the database as the soil removal half time for the chemical of interest (from Strenge and Peterson [1989], p. 2.28).